

### DIAGNOSIS OF HEAD INJURIES

The diagnosis of head injury, with or without skull fracture, when manifested by the usual signs and symptoms, is not difficult. Roentgenograms are of assistance, although commonly are not helpful in the diagnosis of basal skull fracture. However, embarrassing tardiness in diagnosis frequently occurs.

In sober adults, with the history of severe injury to the head, with loss of consciousness, escape of blood, cerebrospinal fluid or brain matter through the cranial apertures, localizing signs of intracranial trauma or disturbance in hydrostatic pressure, etc., a diagnosis of cerebral damage is readily made. In alcoholics, epileptics, and children, however, the possibility is occasionally overlooked.

Skull fracture occurs more frequently in children than is commonly diagnosed. Basal skull fractures are apt to be overlooked in the group composed of intoxicated individuals. The orbital plates, lowermost portions of the middle and posterior fossae, sphenoidal cells, and the walls of the ethmoids are easily susceptible to fracture.

The history of the patient suffering from alcoholism may be as follows: He falls, or is otherwise injured, while intoxicated. He comes to the physician—frequently with a police escort if he be seen at an emergency hospital—or is visited at home. External evidence of trauma may be slight. There may be a hematoma, abrasion or other minor scalp lesion, a supra-orbital wound or, at times, no outward sign of injury whatsoever. The history and psychic response of the patient are of no value. Other injuries may or may not be present. The wound is treated and the patient discharged, observed until sobriety returns, or instructed to report to the physician's office the following day. After twenty-four to forty-eight hours, or later, unmistakable evidence of intracranial pathologic changes occur—cerebral edema, meningitis, subdural or extradural hemorrhage, etc.

This difficulty in diagnosis is likewise met in other injuries to alcoholic persons. It obtains not infrequently in rupture of the urinary bladder and less often to other intra-abdominal traumata. The patient under the influence of alcohol is, so to speak, narcotized or incompletely anesthetized. He may be euphoric and have a sense of well-being when severely injured.

In head injuries, with cerebral functions already disturbed by alcohol, subjective symptoms cannot be interpreted. Further, drunken persons are so frequently subjected to more or less minor injuries that the tendency in diagnosis is to minimize.

The diagnosis of head injury cannot always be made with certainty at the original observation, after even the most complete examination, and is, therefore, occasionally difficult until complications appear. Since the situation arises with almost monotonous regularity at the inquests of coroners in every large city, a warning seems timely.

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### DIAGNOSTIC POINTS IN PELVIC DISEASE

The immediate treatment of acute lower abdominal conditions, in particular those of the pelvis, is still in controversy, although it would seem that we have enough reliable data to warrant better agreement.

Diagnosis may be justifiably in doubt, and symptoms may seem urgent; yet pain, fever, leukocytosis, and even masses, do not always demand immediate operation. When in doubt a good rule, with not too many exceptions, is to treat with emergency surgery those cases with slow erethro-sedimentation, and conservatively those with rapid rates.

Acute appendicitis, twisted pedicle cysts, and disrupted tubal pregnancies are, during their emergency stages, attended with relatively slow sedimentation rates, usually over thirty-five minutes, and all agree that surgery should not be delayed. Such conditions when neglected may, and often do, develop more rapid rates.

One hundred patients, operated upon for acute appendicitis, were studied at the Alameda County Hospital. Their sedimentation times were determined as follows:

Simple acute appendicitis, fifty-four cases: 28 were over 120 minutes; 14, between 60 and 120 minutes; 6, between 40 and 60 minutes; 5, between 25 and 40 minutes; 1 was 21 minutes.

Gangrenous appendicitis, twenty cases: 7 were over 120 minutes; 5, between 60 and 120 minutes; 2, between 40 and 60 minutes; 4, between 25 and 40 minutes; 2, below 25 minutes.

Abscessed and ruptured, twenty-six cases: 5 were over 120 minutes; 5, between 60 and 120 minutes; 7, between 40 and 60 minutes; 5, between 25 and 40 minutes; 4, below 25 minutes.

Seven, it is seen, had rapid sedimentations comparable with those found in acute pelvic inflammatory disease; and of these, six are found in the second and third groups which comprise the advanced or neglected cases. About 7 per cent, then, of appendicitis cases may be expected to have rapid rates, as against well over 90 per cent for the tube infections. So when this differential diagnosis is in question, the test may be the deciding factor.

There were eighty-eight tubal pregnancy patients in the same hospital, upon whom sedimentation tests were recorded: 32 were over 60 minutes; 11, between 50 and 60 minutes; 18, between 35 and 50 minutes; 27, less than 35 minutes.

Seventy-five minutes is the average time in ectopics at the *outset of symptoms*.

The twenty-seven rapid ones need explanation. Three were operated upon three, four, and five days after symptoms began, but the other twenty-four were not treated surgically till ten to forty days had elapsed. Delay in hospitalization of over 30 per cent of these patients shows the difficulty in home diagnosis under present conditions. Evidently competent consultation and more laboratory determinations are necessary.

Of the laboratory tests the blood sedimentation time is entitled to more consideration than it now

receives. If a laboratory is not available, an easy way to manage the determination is to have on hand a few one-dram vials with enough sodium citrate in each to make a 5 per cent solution upon filling the vial with distilled water. A tuberculin syringe and a Linzenmeyer tube are the other requisites. Ten minutes suffices to show whether the time is rapid or not.

In the hospital the difficulties of diagnosis are greatly increased by delay. Most of the group here reported were diagnosed before admission as pelvic inflammatory disease, and that point could have been settled early by one or two sedimentation tests. It is always rapid in salpingitis, and more rapid still when pus forms in the tubes or in the pelvic tissues.

The gynecologist in consultation often finds the leukocyte count already taken, but the sedimentation time seldom. The test has had enthusiastic attention in medical literature and its usefulness seems established.

Those who still believe that acute tubal disease should be treated like acute appendicitis will have less use for the test. But such surgeons are diminishing in number, and those remaining will do well to examine the convincing statistics of busy gynecologic clinics, and heed the advice of experienced gynecologic leaders.

Howard Kelly points out that acute gonorrheal salpingitis almost never ends fatally, that functional integrity of the tube is not always destroyed, that good peritonization is not possible, thus provoking annoying adhesions; that corrective procedures are ill-advised, and that ovarian conservation is attended by risk of failure. He adds that these and other reasons show that any radical exsective procedure during an acute salpingitis is usually unnecessary, and not in accord with surgical conservation; it should be resorted to where a spontaneous cure does not occur.

The late C. Jeff Miller, a great teacher, said in a forceful argument: "If a high mortality rate followed expectant treatment and deferred operation in tubal disease, the parallel with appendicitis would have to be respected, but actually the contrary is true; immediate operation in salpingitis simply introduces an unnecessary element of danger by spreading throughout the abdomen an infection, which, if let alone, would be localized in the pelvis in probably 99 per cent of all cases."

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Depressions would not come, like locusts, to vex us if the persons elected to public office were adequately trained in the science and art of government. Jefferson and Hamilton knew the principles underlying their age of agriculture, craft, and small trade. Our complex times can be coped with only by those who command such subjects as economics, law, social and political theory, biology, and logic. A career of the highest merit is now opening to those who have resolved to prepare themselves for governmental service, doing it with such thoroughness as is found among those entering the medical profession. What the country needs above all is voters and office holders who reason from ascertained premises rather than let themselves be carried to conclusions by fear, favor, or pressure.—Leon J. Richardson.

## ORIGINAL ARTICLES

### ANESTHETIC GAS MIXTURES: THEIR EXPLOSION HAZARDS\*

By CLARENCE G. TOLAND, M.D.

AND

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DISCUSSION by William W. Hutchinson, M.D., Los Angeles; Harry J. Smith, M.D., Oakland; Charles F. McCuskey, M.D., Los Angeles.

**A**NESTHESIA is a surgical necessity. From the purely surgical viewpoint there are only two main considerations in anesthesia: first, the safety of the patient, and, second, the proper and efficient application of the anesthetic agent to the operative maneuvers. A surgeon cannot divest himself of the responsibility for everything connected with the surgical operation, and the method of inducing and maintaining anesthesia.

#### SURGICAL ANESTHESIA BY GAS INHALATION

The comparative values of the different methods of inducing and maintaining surgical anesthesia—local, regional, spinal, rectal, and inhalation—judged from the criteria mentioned above, need not be discussed here. They are matters of opinion, and there are indications and contraindications for all of them. The fact is, that in an overwhelming majority of important surgical procedures the method of obtaining surgical anesthesia by gas inhalation is that selected by surgeons and, until some more perfect method is discovered, this will probably continue to be the case. There are, of course, drawbacks, dangers, and postanesthetic complications associated with all types of inhalation anesthesia, and they are fairly well known and discussed in the literature.

#### CYCLOPROPANE

Personally, we have found cyclopropane-oxygen to be the most satisfactory general anesthetic gas mixture, and have used it in a large majority of our cases during the past few years, since its properties have been fully established clinically.

Cyclopropane, a hydrocarbon gas formerly called trimethylene, is an isomer of propylene; it is inflammable and explosive with mixtures of 20 to 85 per cent of oxygen; it is non-irritating and is rapidly eliminated unchanged from the body. As an anesthetic agent it seems to combine the safety and speed of nitrous oxid with the calm, quiet, and moderate relaxation obtained with chloroform. It possesses the desirable feature which makes ether so popular, namely, that in the event of an overdose the respiration fails before the heart. Cyclopropane has a relatively low toxicity and, according to Woodbridge,<sup>1</sup> its administration abolishes the cyanosis and diminishes the dyspnea of patients with decompensated hearts. The large amount of oxygen in cyclopropane oxygen mixtures makes this type of anesthesia useful in patients with severe

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\* Read before the Anesthesiology Section of the California Medical Association at the sixty-sixth annual session, Del Monte, May 2-6, 1937.